

App. No. 10/712,367

Response to 11/23/05 Office Action

REMARKS/ARGUMENTS**A. Examiner's Interview**

Applicants thank the Examiner for conducting a telephone interview with Applicants' representative David Benson on February 7, 2005. During the interview, the claimed feature of a polishing article including an epoxy resin at a concentration that is between about 5% and about 15% by weight of a filler material was discussed and compared with the resin and filler concentrations set forth in U.S. Patent No. 6,099,394 ("James"). Since James lists sweeping ranges for resin materials, it was agreed that the importance of the presently claimed ratio should be specifically emphasized in the record. It is therefore hoped that the following remarks regarding the claimed ratio will establish the inventive aspects of the claims in contrast with the prior art.

A. Rejections Under 35 U.S.C. § 103(a)

Claims 30, 35, 37 to 43, 48, and 50 to 53 are rejected as being unpatentable over 1) U.S. Patent No. 6,099,394 ("James") in view of U.S. Patent No. 5,958,794 ("Bruxvoort") and U.S. Patent No. 6,537,134 ("Newell"); or 2) U.S. Patent No. 3,850,589 ("Charvat 589") in view of James, Bruxvoort, U.S. Patent No. 5,584,146 ("Shamouillan"), and Newell; or 3) U.S. Patent No. 4,588,420 ("Carvat 420") in view of James, Bruxvoort, Shamouillan, and Newell; or 4) Bruxvoort in view of James, Shamouillan, and Newell; or 5) U.S. Patent No. 5,110,322 ("Narayanan") in view of James, Bruxvoort, Shamouillan, and Newell. These rejections are respectfully traversed.

Before discussing the prior art, the following overview of the present invention will establish the unique features of the claimed invention and the advantages that the features provide. Reference will be made to passages in the specification to corroborate the summary of these features and advantages.

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As set forth in the claims, the present invention is directed to a polishing article (independent claim 30), and to a method for chemical mechanical planarization of a workpiece surface using the polishing article (independent claim 43). The polishing article comprises a substantially uniform mixture that includes abrasive material and a low weight:weight ratio between an epoxy binder resin (p.0030) and a friable filler material having a hardness of less than 3 on the Mohs scale (p.0029). More particularly, the polishing article is constructed with the resin included at a concentration that is between about 5% and about 15% by weight of the filler material (p.0030). As recited in the claims and throughout the specification, the purpose for the specific ratio of resin and filler material is "to thereby cause said polishing surface to continually wear during polishing and thereby facilitate continuous exposure of the abrasive" (claims 30 and 43; see also p. 0026).

Conventional polishing pads similar to those of the present invention have higher concentrations of resin with respect to the filler material. Although higher binder resin provides durability, one problem associated with such polishing pads is that the abrasive material tends to dull over time. The relatively high concentration of binder resin prevents the polishing surface from wearing away, but also holds the dull abrasives in place. The polishing pad must be too rapidly discarded and replaced with another polishing pad that has fresh abrasive material.

In contrast, the polishing article of the present invention has friable filler material with only between about 5 and 15% epoxy resin by weight of the filler. Since the filler material is loosely bound by the small concentration of resin, the polishing pad surface is readily worn away. Thus, new abrasive material is continuously being introduced to the polishing surface before the abrasive material can dull and render the polishing pad ineffective. The removal rate of the polishing pad is therefore consistent, and the workable life of the polishing pad is extended beyond that of similar conventional polishing pads (p.0026).

The references cited in the Office Action fail to teach or suggest that in a polishing pad, a heat-curable resin having an epoxy group is included at between about 5% and about 15% by weight of the friable filler. Each reference, and the features disclosed by each, has been discussed in the prior response, and the arguments made therein are incorporated herein in order to be fully responsive to the Office Action. The James references is the only prior art cited for

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allegedly disclosing a binder that includes heat curable resin having an epoxy group, the resin being included at between about 5% and about 15% of the filler material. The Examiner asserts, "[James] teaches amounts for the filler and binder and when these amounts are calculated in terms of a ratio, said ratio will encompass the claimed ranges." In response, Applicants acknowledge the sweeping ratios that James discloses. Indeed, when calculating all possible formulations obtainable from the broad ratios set forth in James, one could practically obtain from 0% to much greater than 100% resin by weight with respect to the filler material. This is precisely why James fails to teach or suggest the specific ratio of 5 to 15% epoxy resin binder with respect to the filler, or the advantages provided by such a specific ratio. Certainly a person of ordinary skill in the pertinent art would not find motivation from reading James to produce the presently claimed polishing pad with its low resin concentration and the benefits from such a polishing pad.

None of the prior art cited compensates for the deficiency in James by teaching or suggesting a polishing article, or a polishing step using such an article, comprising a resin that has at least one epoxy group and is included at a concentration that is between about 5% and about 15% by weight of a friable filler material. As previously established, the relationship between the amounts of friable filler and the amounts of resin are of critical importance because it provides a construction that, as originally recited in the independent claims, "cause[s] said polishing surface to continually wear during polishing and thereby facilitate continuous exposure of the abrasive." Consequently, the concentration set forth in the independent claims are not obvious modifications of the prior art, but provide a surface wear and polishing feature that is neither explicitly disclosed nor inherently part of the prior art.

To summarize, the pending independent claims recite that the epoxy resin is included at between 5 and 15% by weight of the filler material having a hardness of less than 3 on the Mohs scale, and neither James nor the remaining cited prior art teach or suggest this feature. It is therefore respectfully requested that the rejections under 35 U.S.C. § 103(a) be withdrawn.

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C. Conclusion

In view of Applicant's amendments and remarks, it is respectfully submitted that Examiner's objections and rejections have been overcome. Accordingly, Applicants respectfully submit that the application is now in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further discuss this application, Applicants request that the Examiner contact the Applicants attorneys at the below-listed telephone number.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

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Dated: February 23, 2006

By: 

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